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(54) Demolition apparatus for heavy demands, in particular a demolition or scrap shear

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Demolition device for heavy demands, in particular a demolition or scrap shear

The invention relates to a demolition apparatus for heavy demands, in particular a demolition or scrap shear with a housing that is installable on a piece of equipment, in particular an excavator, and has two interacting jaws that can swivel relative to each other, where a first jaw is detachably mounted on the housing by means of two holding devices spaced at a distance from each other and a second jaw is mounted on the first jaw using a swivel bearing and is held by means of a drive system that acts at a distance from the swivel bearing, the two jaws being detachable from the housing as a unit.

On a demolition apparatus such as is known from EP-B-0 453 773, and which is normally intended to be installed on the boom or arm of an excavator or similar piece of equipment, the jaws are connected with each other via a swivel bearing and one of the jaws is operable by means of a hydraulic cylinder, whereby the jaws of the demolition apparatus may be opened or closed. At the same time, the swivel bearing also serves to attach both jaws to the housing of the demolition apparatus.

When operating the demolition apparatus the need often arises to replace the jaws, since either the blades or cutting edges are worn down, or else different appropriately suitable jaws must be mounted to demolish other materials. To this end, with the demolition apparatus according to EP-B-O 453 773 the swivel bearing must be disassembled, whereupon the two jaws are removed from the housing individually, which, however, is very work-intensive and time-consuming. Furthermore, the constant assembling and disassembling of the swivel bearing is unfavorable with regard to the storage properties.

A similar demolition apparatus is known from EP-A-O 641 618, which was the point of departure for the introductory clause of Claim 1, but there the swivel bearing has a special bolt design that enables the mount of the swivel bearing on the housing to be released without separating the two jaws from each other, so that the jaws may be removed from the housing as a coherent unit. This makes the design of the swivel bearing very complex, and in particular there is the disadvantage that the bolt design is severely limited in its constructive design options because of its double function as a swivel bearing and a detachable mount for the jaws, so that it is impossible or very difficult to achieve an optimal design in regard to both desired functions.

The object of the invention is to create a demolition apparatus of the named type, with which the forenamed disadvantages are avoided and the jaws are replaceable in a simple way as a unit.

This problem is solved according to the invention with a demolition apparatus of the named type by having the two holding devices formed independently of the swivel bearing. This provides a construction in which the first jaw is mounted on the housing of the demolition apparatus by means of the two holding devices. The second jaw is not mounted directly on the housing, but rather is attached partly to the first jaw through the swivel bearing and partly held by the drive device, which is preferably a hydraulic cylinder mounted on the housing. The swivel bearing thus functions merely as a mutual pivoting holder for the two jaws, and not to attach them to the housing as is known from the existing art. Thus the swivel bearing can be designed optimally for the function which it is to fulfill.

To remove the jaws from the housing, the two holding devices for the first jaw and the attachment between the second jaw and the drive device are released, while the two jaws continue to be connected to each other through the swivel bearing. In this way it is possible to remove the two jaws from the housing or to mount them on it as one structural unit.

In order to be able to release or engage the holding devices with which the first jaw is mounted on the housing in a simple way, a refinement of the invention calls for each holding device to have at least one sliding bolt that can be repositioned between a locked position that engages the first jaw and a detaching or re-equipping position that releases the first jaw. The bolt is preferably mounted on the housing so that it can slide, and can be repositioned axially by means of an operating device, for example a spindle drive.

For reasons of force transmission it has proven advantageous to provide a pair of bolts for each holding device, with two bolts arranged essentially coaxially, which can be repositioned by means of a common operating device.

Reliable guidance of the bolts during the repositioning motion can be achieved if they are guided in a pipe traverse that is mounted on the housing so that they cannot rotate but can slide. In the releasing, re-equipping position the two bolts are drawn as far as possible into the pipe traverse, while in the locked position they project from the ends of the pipe traverse. In order to be able to accomplish the repositioning motions of the two bolts of the bolt pair in different directions by means of a common operating device, a refinement of the invention calls for a spindle with two oppositely threaded sections, each of them engaged by one of the bolts of the bolt pair.

Preferably the first jaw reaches around the outside of the housing on opposite sides, so that the bolts that project out of the pipe traverse are able to engage corresponding bores in the first jaw and fix it on the housing.

With the design of the holding device according to the invention, it is possible to move the bolts uniformly and simultaneously by applying simple rotary motions of the spindle, so that very short changing times for the jaws can be achieved.

Additional details and features of the invention may be seen from the following description of an exemplary embodiment, with reference to the drawing. The figures show the following:

Figure 1: a side view of the demolition device with opened jaws, and

Figure 2: the sectional view at II - II in Figure 1

A demolition or scrap shear 10 according to Figure 1 has a housing 11, whose upper part may be attached via a junction head 12 to the boom of an excavator or some other piece of equipment, not shown, in such a way that the shear 10 can be pivoted around an axis A, as indicated by the double arrow D.

As Figure 2 shows, the housing 11 has two essentially parallel side walls 11a with a space between them. A first jaw 13 is mounted on the side walls of the housing 11 by means of two holding devices 20, positioned with a space between them. The first jaw 13 supports, via a swivel bearing 15, a second jaw 14, which is coupled to a bearing 18 spaced away from swivel bearing 15 by a hydraulic cylinder 16, which is attached, in a rotating manner, to the housing by means of a bearing 17. When the hydraulic cylinder 16 is operated, the second jaw 14 can be pivoted around the swivel bearing 15 relative to the first jaw 13 and relative to the housing 11, whereby the shear 10 can be opened and closed.

Figure 2 shows the construction of one of the holding devices 20, with a pipe traverse 21 welded in between the side walls 11a of the housing 11, which penetrates the side walls 11a and is open at the faces. At both faces of the pipe traverse 21, a bolt 28 with an axial bore 28b is inserted. Both coaxial bolts 28 are movable in the longitudinal direction of the pipe traverse 21, while between the outer surface of each bolt 28 and the inner surface of the pipe traverse 21 a steel liner 27 with an inside groove 30 running in the axial direction is formed, which is engaged by a key 29 that is attached to the respective bolt 28. The engagement of the key 29 in the groove 30 prevents the bolts 28 from turning.

The pipe traverse 21 is also penetrated by an axial spindle 23, positioned essentially centrally, which is mounted through a central partition 22 in the central zone of the pipe traverse 21 so that it can rotate but cannot shift laterally. Each of the coaxial bolts 28 has a threaded section 23a or 23b of the spindle 23 associated with it, with the two threaded sections 23a and 23b running in different directions and each engaging the inside thread 28a of the respective bolt 28.

The first jaw 13 has two side walls 13a spaced at an interval, running essentially parallel, whose horizontal clearance corresponds approximately to the external dimensions of the pipe traverse 21. This way, the first jaw 13 is able to reach around the outside of the housing 11 and can be brought into alignment with pipe traverse 21 with the bores 25 formed in the side walls 13a, into each of which a steel liner 26 is inserted. In this state it is possible to move the bolts 28 from the position shown on the left side of Figure 2, retracted into the pipe traverse, to the locked position shown on the right side of Figure 2, in which the bolts protrude from the pipe traverse 21 and engage the bores 25 of the side walls 13a of the first jaw 13.

To move the bolts 28 of a bolt pair axially, a user applies torque in a known way to the nuts 24 formed at the end of the spindle 23, whereby the spindle 23 is turned. The rotation of the spindle is transmitted to the two bolts 28 through the engagement of the opposing threads 23a and 23b with the inside threads 28a. But since the bolts 28 are prevented from rotating because of the engagement of the key 29 in the groove 3, the rotation of the spindle 23 results in an axial displacement of the bolts 28, so that they can be moved between the two positions shown in Figure 2.

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What is claimed is:

1. A demolition apparatus for heavy demands, in particular a demolition or scrap shear with a housing (11) that is installable on a piece of equipment, in particular an excavator, and has two interacting jaws (13, 14) that can swivel relative to each other, where a first jaw (13) is detachably mounted on the housing (11) by means of two holding devices (20) spaced at a distance from each other and a second jaw (14) is mounted on the first jaw (13) using a swivel bearing (15) and is held by means of a drive system (16) that acts at a distance from the swivel bearing (15), the two jaws (13, 14) being detachable from the housing (11) as a unit, characterized in that the two holding devices (20) are formed independent of the swivel bearing (15).

2. A demolition apparatus according to Claim 1, characterized in that each holding device (20) has at least one displaceable bolt (28) that can be moved between a locked position engaged with the first jaw (13) and a re-equipping position that releases the first jaw (13).

3. A demolition apparatus according to Claim 2, characterized in that each holding device (20) has a pair of bolts with two bolts (28) positioned essentially coaxially, which are movable by means of a common operating device (23, 23a, 23b, 28a).

4. A demolition apparatus according to Claim 3, characterized in that the operating device is a spindle drive (23, 23a, 23b, 28a).

5. A demolition apparatus according to Claim 4, characterized in that the spindle drive has a spindle (23) with two segments of opposing threading (23a, 23b), each of which is engaged with one of the bolts (28) of the bolt pair.

6. The demolition apparatus according to one of Claims 2 through 5, characterized in that the bolts (28) are guided in a pipe traverse (21) attached to the housing (11) so that they cannot rotate but can slide.

7. A demolition apparatus according to one of Claims 1 through 6, characterized in that the first jaw (13) reaches around the outside of the housing (11), and that in the locked position the bolts (28) protrude out of the pipe traverse (21) and engage bores (25) in the first jaw (13).

8. A demolition apparatus according to one of Claims 1 through 7, characterized in that the drive device is a hydraulic cylinder (16) mounted on the housing (11).